

Small H_3^+ Emission Patches in the Vicinity of Jupiter's Auroral Regions

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We investigated spatial characteristics of small isolated patches of $3.5 \mu\text{m } H_3^+$ emission appeared in Protocam/IRTF images in the vicinity of the auroral regions of Jupiter. In particular, we focused on a small patch and Io footprint connection theory, which was recently suggested by Cornnerney et al. We examined a total of 166 images obtained in 1991 and 1992, and found a total of 34 images containing at least one clearly isolated small patch. Although there seems to be a crude correlation between Io's phase angle and small patch's longitude, we found that: (1) Io's longitudes are usually more than 50° apart from the small patch's longitudes for three observational sequences taken on three different days: (2) The positions of the small patch are significantly equatorward by $5^\circ - 10^\circ$ latitude from current Io footprint models in the longitude range of 270° to 360° . There seems no simple connection of the small patch to Io flux tube, and there may be additional effects such as thermospheric wind or temporal motion of auroral particle beam in order to explain the apparent motion of the small H_3^+ emission patch.

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